

## CLAIMS

What is claimed is:

1. A method of generating multiple independent images from a single display screen, said method comprising:  
illuminating said display screen with a plurality of sources to create a plurality of display sub-images; and  
focusing said display sub-images with a display lens, wherein each said display sub-image is redirected along one of a plurality of sub-paths from a point proximate to the focal point of said display sub-images.
2. The method of claim 1 wherein each source illuminates said display screen from a different direction.
3. The method of claim 2 wherein said sub-path of each said display sub-image is associated with said direction of said source creating said display sub-image.
4. The method of claim 1 wherein a first source illuminates said display screen with light having a first polarization, and wherein a second source illuminates said display screen with light having a second polarization.
5. The method of claim 4 wherein said sub-path of said display sub-image is associated with said polarization of said source creating said display sub-image.
6. The method of claim 1 further comprising:  
forming a real image along at least one said sub-path.
7. The method of claim 1 wherein a numerical aperture of each said sub-image is optically adjusted for viewing by an eye of a user.

8. A method of transmitting different images to each eye of a user using a single display screen, said method comprising:

creating a plurality of sub-images of said single display screen wherein said sub-images are focused by a lens proximate to said display screen; and

redirecting each said sub-image to one of a plurality of sub-paths from a point proximate to the focal point of said sub-images.

9. The method of claim 8 wherein creating said plurality of sub-images comprises: displaying on said display screen a plurality of interlaced data streams, wherein each said data stream is linked with a direction of light illuminating said display screen.

10. The method of claim 9 wherein a first data stream is linked with a first source illuminating said display screen from a first direction and a second data stream is linked with a second source illuminating said display screen from a second direction, and wherein said display screen is illuminated by said first source when said first data stream is displayed and illuminated by said second source when said second data stream is displayed.

11. The method of claim 8 wherein said redirecting comprises: focusing each said sub-image to a focal point of said lens; and arranging a splitter proximate to said lens focal point.

12. The method of claim 8 wherein each said sub-path is intended for viewing by a specific eye of a user.

13. The method of claim 12 wherein said data streams generate a three-dimensional image when viewed by the eyes of said user.

14. A head mounted display for generating images comprising:  
means for illuminating a display screen from a plurality of directions, wherein a plurality of display sub-images of a display screen are created;  
means of focusing said sub-images; and  
means proximate to the focal points of said sub-images for redirecting each said sub-image along one of a plurality of sub-paths.

15. The head mounted display of claim 14 further comprising:  
source light incident upon said display screen from a first direction, said first light direction causing a sub-image to be focused to a first focal point; and  
source light incident upon said display screen from a second direction, said second light direction causing a sub-image to be focused to a second focal point.

16. The head mounted display of claim 15 further comprising:  
a means for blocking light interposed between said focusing means and said splitting means.

17. The head mounted display of claim 15 further comprising:  
a first reflective surface positioned to redirect light focused to said first focal point along a first sub-path; and  
a second reflective surface positioned to redirect light focused to said second focal point along a second sub-path.

18. The head mounted display of claim 15 wherein:  
a plurality of data streams are alternately displayed on said display screen, and wherein each data stream is linked with either said first or said second light direction.

19. The head mounted display of claim 15 wherein said display screen is illuminated from said first light direction only when a first data stream is displayed, and said display screen is illuminated from said second light direction only when a second data stream is displayed.

20. A system for generating multiply images comprising:  
a display screen illuminated by a plurality of light sources to generate a plurality of sub-images;  
optics arranged proximate to said display screen positioned to focus said sub-images;  
and  
at least one redirector arranged proximate to the focal point of at least one sub-image, said redirector operable for redirecting said sub-image along one of a plurality of optical sub-paths.

21. The system of claim 20 wherein each source illuminates said display screen from a different direction.

22. The system of claim 20 further comprising:  
an aperture stop interposed between said optics and said at least one director, wherein the light generating each said sub-image may be selectively prevented from striking said at least one reflector.

23. The system of claim 20 further comprising:  
a plurality of data streams alternately displayed on said display screen, wherein each said data stream is linked with at least one light source, and wherein said display screen is illuminated by said light source linked with said data stream when said data stream is displayed.

24. The system of claim 20 wherein at least one light source reflector is arranged about a display axis, wherein said light source reflector reflects at least a portion of the light from said plurality of light sources onto said display screen and transmits at least a portion of the light reflected by said display screen.

25. The system of claim 24 wherein said light source reflector is a polarizing beam splitter.

26. The system of claim 20 where in the plurality of light sources are arranged about a display axis and the plurality of redirectors are partially-reflective surfaces interposed between said display screen and said light sources.

27. A method of generating multiple independent images from a single display screen, said method comprising:

illuminating said display screen with a plurality of light beams to create a plurality of sub-images, wherein at least two said beams have different polarizations; and

focusing said sub-images with a lens, wherein said each said sub-image is redirected along an independent sub-path from a point proximate to the focal points of said sub-images.

28. The method of claim 27 wherein an asymmetrical V-mirror redirects each said display sub-image along one of said sub-paths.

29. The method of claim 27 wherein said lens is glass.

30. The method of claim 27 wherein said sub-path of said sub-image is determined by the polarization of light creating said sub-image..

31. A method of transmitting different images to each eye of a user using a single display screen, said method comprising:

interlacing a plurality of data streams, wherein each said data stream is linked to a direction of light polarization of incident light;

creating a plurality of sub-images of said display screen by displaying said interlaced data streams and illuminating said display screen, wherein said sub-images are focused by a lens located proximate to said display screen; and

redirecting each said sub-image to one of a plurality of sub-paths from a point proximate to the focal point of said sub-images.

32. The method of claim 31 wherein said incident light is linearly polarized, circularly polarized, or elliptically polarized.

33. The method of claim 31 wherein a first data stream is linked with light polarized in a first direction and a second data stream is linked with light polarized in a second direction.

34. The method of claim 33 wherein said display screen is illuminated by light polarized in said first direction when said first data stream is displayed, and said display screen is illuminated by light polarized in said second direction when said second data stream is displayed.

35. The method of claim 33 wherein light reflected from said display screen is polarized in said first direction when said first data stream is displayed, and light reflected from said display screen is polarized in said second direction when said second data stream is displayed.

36. The method of claim 31 wherein said redirecting comprises:  
focusing each said sub-image to a focal point of said lens; and  
arranging an asymmetrical V-mirror proximate to said focal point.

37. The method of claim 31 wherein said lens is glass.

38. The method of claim 31 wherein each sub-path is intended for viewing by a specific eye of a user.

39. The method of claim 31 wherein said data streams generate a three-dimensional image when viewed by the eyes of said user.

40. The method of claim 31 wherein said sub-path along which said sub-image is transmitted depends upon said polarization of the light creating said sub-image.

41. A head mounted display for generating images comprising:  
means for illuminating a display screen with light beams of at least two different polarizations;

means of focusing said light beams; and

means proximate to the focal points of said sub-images for redirecting each said sub-image along one of a plurality of sub-paths.

42. The head mounted display of claim 41 further comprising:  
light from a source that is incident upon said display screen and polarized in a first direction thereby creating a first sub-image; and

light from a source that is incident upon said display screen and polarized in a second direction thereby creating a second sub-image.

43. The head mounted display of claim 41 further comprising:  
a polarization beam splitting surface proximate to a focal point of said first sub-image and positioned to redirect light reflected from said display screen along a first sub-path; and  
a reflective surface proximate to said focal point and positioned to redirect light reflected from said display screen along a second sub-path.

44. The head mounted display of claim 43 wherein light polarized in said first direction is redirected along said first sub-path to a first eye of a user and light polarized in said second direction is redirected along said second sub-path to a second eye of a user.

45. The head mounted display of claim 43 wherein a first and a second said data stream are alternately displayed on said display screen, wherein said display screen is illuminated by said light from said first polarized direction when said first data stream is displayed, and wherein said display screen is illuminated by light from said second polarized direction when said second data stream is displayed.

46. A method for generating multiple images from a single display screen, said method comprising:

illuminating said display screen to generate an image of said display screen;  
focusing said image with a lens;  
passing said image through an adjustable polarizer; and  
redirecting the image as a sub-image along one of a plurality of sub-paths depending on the polarization of the light.

47. The method of claim 46 further comprising:

forming a real image along at least one said sub-path.

48. The method of claim 46 wherein said sub-image is optically adjusted for viewing by an eye of a user.

49. A head mounted display comprising:  
a light source illuminating a display screen creating an image;  
a lens focusing said image to a point;  
a polarization adjustment unit operable to polarize the light creating said image; and  
a splitter positioned proximate to said focal point operable to redirect said image as a sub-image along one of a plurality of sub-paths depending on the polarization of said image.

50. The head mounted display of claim 49 wherein said polarization adjustment unit is a polarization rotator or a polarization modulator.

51. The head mounted display of claim 49 wherein a first and a second data stream are alternately displayed on said display screen, wherein said polarization adjustment unit polarizes the light creating said image in a first direction when said first data stream is displayed, and said polarization adjustment unit polarizes the light creating said image in a first direction when said second data stream is displayed.

52. The head mounted display of claim 51 further comprising:  
a polarization beam splitting surface proximate to said focal point and positioned to redirect light polarized in a first direction along a first sub-path; and  
a reflective surface proximate to said focal point and positioned to redirect polarized in a second direction along a second sub-path.

53. A system for generating multiple images, said system comprising:  
a display screen illuminated by at least one light source;  
a lens that focuses light reflected from said display screen; and  
a splitter placed proximate to the focal point of light from said at least one light source.

54. The system of claim 53 further comprising:  
a plurality of light sources, wherein such said source illuminates said display screen with light of different polarization.

55. The system of claim 54 wherein said display screen displays a plurality of data streams, wherein each said data stream is linked with one of said light sources, and wherein said display screen is illuminated by each said source only when said data stream linked with said source is displayed.

56. The system of claim 53 wherein said splitter is an asymmetric V-mirror.

57. A system for generating multiple images, said system comprising:  
a display screen illuminated by at least one light source;  
a lens that focuses light reflected from said display screen;  
a splitter placed proximate to the focal point of light from said at least one light source;  
and  
a polarization rotator interposed between said lens and said splitter.

58. The system of claim 57 wherein said display screen displays a first and a second data stream, wherein said first data stream is linked with a first polarization direction and second data stream is linked with a second polarization direction, and wherein said polarization rotator rotates the light reflected from said display screen in said first polarization direction when said first data stream is displayed and rotates the light reflected from said display screen in said second polarization direction when said second data stream is displayed.